

**REMARKS**

The claims have been amended to correct typographical errors, and to address the examiner's comment that claims 11 and 13-15 are "purely functional in nature."

The foregoing amendments to the specification are presented to make minor corrections to the specification and to correct typographical errors therein. No new matter has been added by the foregoing amendments to the specification.

In the office action mailed November 17, 2004, the examiner deemed claims 25-26 and 33-34 as withdrawn from further consideration as being drawn to a non-elected invention. In order to expedite prosecution of the application, the applicants have canceled claims 25-26 and 33-34, without prejudice.

In the office action dated November 17, 2004, claims 1-10, 16, 21, 22, and 27-32 were rejected as being anticipated by Xing et al., U.S. Patent No. 6,341,249. Claims 17-20, 23, and 24 were rejected under 35 U.S.C. § 103(a) as unpatentable over Xing et al. in view of ordinary skill in the art.

Reconsideration and allowance of the claims is respectfully requested in view of the following remarks.

Claim 1 and claims 2-24 depending therefrom are directed to an attitude determination and control system for a spacecraft. The attitude determination and control system includes a unified attitude sensor set that is adapted for use during all phases of spacecraft operations and a processor capable of determining and controlling attitude of the spacecraft during the operations using sensor inputs from the unified attitude sensor set.

Claim 27, and claim 28 depending therefrom are directed to an attitude determination and control system for a spacecraft that includes a plurality of star trackers adapted for use during all phases of spacecraft operations, and a processor capable of determining and controlling attitude of the spacecraft during the spacecraft operations using inputs from the star trackers as the sole source of attitude sensor data.

Claims 29, and claim 30 depending therefrom are directed to an attitude determination and control system for a spacecraft that includes a plurality of star trackers and gyro units that are adapted for use during all phases of spacecraft operations, and a processor capable of determining and controlling the attitude of the spacecraft during the spacecraft operations using inputs from the star trackers and gyro units as the sole source of attitude sensor data.

Claim 31, and claim 32 depending therefrom are directed to an attitude determination control system for a spacecraft that includes a plurality of star trackers, gyro units, and solar wing current sensors that are adapted for use during all phases of spacecraft operations, and a processor capable of determining and controlling the attitude of the spacecraft during the spacecraft operations using inputs from the star trackers, gyro units, and solar wing current sensors as the sole source of attitude sensor data.

35 U.S.C. § 1.2(e) Rejections

Claims 1-10, 16, 21, 22, and 27-32 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Xing et al. Applicants respectfully traverse these rejections. Under Section 2131, the MPEP directly states: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." See, *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

As noted in the Abstract thereof, Xing et al. is directed to an "apparatus and method of unified orbit and attitude control for acquisition and maintenance techniques of multiple satellites in a formation based on GPS input, utilizing Modern Feedback Control for providing precise autonomous on-board orbit and attitude control."

Thus, Xing et al. is directed to a unified orbit and attitude control system that uses GPS feedback. The rejected claims all recite the use of a unified sensor set. It appears that the examiner is mistakenly confusing a unified control system, that is allegedly disclosed in the Xing et al. patent, with a unified sensor set, as claimed in the present application. Furthermore, with regard to claims 2-15, and 27-32, that recite the use of star trackers during

all phases of spacecraft operations, the examiner appears to be mistakenly relying on the mere mention of star trackers as a source of attitude information in the Xing et al. patent, e.g., at column 4, lines 40-41. The Xing et al. patent fails to disclose or suggest the use of star trackers or any set of sensors during all phases of spacecraft operations (such as, for example, during both transfer orbit operations and on-station operations). Accordingly, the anticipation rejections based on Xing et al. are improper and should be withdrawn.

#### 35 U.S.C. § 103(a) Rejections

Claims 17-20 and 23-24 have been rejected as obvious over Xing et al. in view of ordinary skill in the art. Applicants respectfully traverse these rejections.


"To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." MPEP § 2143.03. As noted above with regard to the anticipation rejections, Xing et al. does not disclose or suggest the use of a unified attitude sensor set that is adapted for use during all phases of spacecraft operations. Accordingly, the rejection of claims 17-20 and 23-24 as obvious over Xing et al. in view of ordinary skill in the art is also improper and should be withdrawn. Furthermore, as noted above, the Xing et al. reference is directed to the use of GPS feedback for attitude control of spacecraft, and therefore teaches away from the present invention, that is directed to the use of a unified sensor set for spacecraft attitude control during all phases of spacecraft operation. Because the cited references do not teach or suggest the use of a unified attitude sensor set that is adapted for use during all phases of spacecraft operations, *prima facie* obviousness cannot be established.

Conclusion

For the foregoing reasons, reconsideration and withdrawal of the rejections of the claims and allowance thereof is respectfully requested. Should the examiner wish to discuss the foregoing, or any matter of form, in an effort to advance this application towards allowance, the examiner is urged to telephone the undersigned at the indicated number.

Dated: February 16, 2005

Respectfully submitted,

By   
Gregory C. Mayer  
Registration No.: 38,238

MARSHALL, GERSTEIN & BORUN LLP  
233 S. Wacker Drive, Suite 6300  
Sears Tower  
Chicago, Illinois 60606-6357  
(312) 474-6300  
Attorneys for Applicant